# Pine Gulch Creek Watershed Enhancement Project

**Introduction**
Located in west Marin County, the 7.5 square mile Pine Gulch Creek watershed provides habitat for federally listed Central California Coast coho salmon (*Oncorhynchus kisutch*) and Central California Coast steelhead trout (*Oncorhynchus mykiss*). In addition, coho salmon are listed as a candidate species under the California Endangered Species Act (CESA). The subject of this analysis, the Pine Gulch Creek Watershed Enhancement Project, is a voluntary cooperative effort on the part of the participating organic farmers: Fresh Run Farms; Paradise Valley Farms; and Star Route Farms, whose historic riparian water use for crop production date back several decades. As a group, these Bolinas farmers form a vital component of West Marin agricultural production. Through this project, they propose to modify existing water operations to support sustainable agriculture and enhance aquatic habitat supporting coho salmon and steelhead trout.

The proposed project includes appropriation of water to storage during the winter season, controlled riparian diversion between April and July 1, and no diversion between July 1 and December 15 of each year. This solution has been developed through consultation with the California Department of Fish and Game (CDFG), National Marine Fisheries Service (NOAA-Fisheries), and State Water Resources Control Board (SWRCB). As part of the project, the farmers will apply for appropriative water rights, and dedicate their summer commercial irrigation riparian rights to instream flow for the benefit of fish habitat.

This report documents existing and proposed water use, as well as hydrologic monitoring information collected by the United States Geological Survey (USGS) between 1968 and 1970, and the National Park Service since 1998. The proposed strategy will significantly improve the ability of the farmers to protect instream flow throughout the year, while increasing agricultural sustainability in the area.

**Project History**
The project was originally conceived in 1998, prior to the return of coho salmon to the watershed (Brown and Ketcham 2002) and the petition to list coho salmon as a State endangered species in this area. The initial project concept, submitted for a Coastal Permit/Grading Permit to the County of Marin in September 2002, proposed construction of riparian (30 day) ponds on each of the three participating farms. The intention of these riparian ponds was to enable the three farmers to regulate the amount and timing of pumping from the creek, thus reducing instantaneous withdrawals during the low flow periods.

Based on comments from the California Department of Fish and Game, NOAA-Fisheries, and the public, the farmers have modified the project as described below.

**Project Description**
The project includes an irrigation diversion and storage program, combining limited riparian withdrawals between April and June, and appropriative storage that will accommodate water needs for the growing season between July and December. All irrigation water diversions occur through screened pumps withdrawing water from the water column or intakes installed into the gravel of the stream bed. All water diverted through this project will be pumped into the ponds, and all irrigation of crops will be applied directly from the storage ponds. This will allow for lower diversion rates from the stream, further buffering the riparian diversion impacts. Because of limited storage, farmers would replace water used for irrigation with riparian water between April 1 and June 30, at rates and volumes presented in this document. The farmers will dedicate all of their commercial riparian diversion between July 1 and December 15 to instream flow for the benefit of coho salmon and steelhead trout under **California Water Code Section 1707** authority. This dedication will be linked directly with the appropriative storage rights associated with the proposed ponds. Concurrent to the county permit submittals, the farmers will submit appropriate applications to the State Water Resources Control Board.

**Storage Plan**
Appropriated water storage volumes have been calculated to insure that the farmers can meet their annual irrigation needs between July 1 and the end of the growing season.

| Operation | Proposed Storage | Pond Sites | Cease Diversion | Place of Use |
|---|---|---|---|---|
| Fresh Run Farms (Peter Martinelli) | 20.5 acre-ft | 2 | July 1 | 22.5 acres certified organic cropland on APN 18809015 APN 18812019 |
| New Land Trust (Dennis Dierks) | 5.5 acre-ft | 1 | July 1 | 10 acres certified organic cropland on APN 18815069 |
| Star Route Farms (Warren Weber) | 35.4 acre-ft | 2 | July 1 | 29 acres certified organic cropland on APN 19301019 APN 18817045 |

At Fresh Run Farms, two ponds would store approximately 20 acre-feet of water. At New Land Trust, one pond will store approximately 5.5 acre-feet of water. At Star Route Farms, two ponds would store approximately 35.4 acre-feet of water. Pond feasibility and design has been completed by Lee Erickson of Erickson Engineering. The storage volumes are required to meet the minimum bypass flow objectives identified below.

**Cumulative Flow Impairment Index (CFII)**
Under the proposed project conditions, the Cumulative Flow Impairment Index (CFII), calculated for a single Point of Interest (POI), which is downstream of all project diversions, is **0.81%**. Based on CDFG and NOAA-Fisheries Guidance, a CFII of less than 5% shows there is little chance of significant cumulative impacts due to diversion, and that additional CFII evaluation is not required.

The POI is the downstream National Park Service monitoring station (downstream of Olema-Bolinas Road) that has been in operation since 1998. All diversions within the watershed are located upstream of this point. The Estimated Unimpaired Runoff (EUR) is derived from the seven year record of streamflow monitoring (WY 1968-1970, 1999-2002) for the period December 15 – March 31. The EUR value for the POI is 7,581 acre-feet. The Calculated Diverted Volume (CDV) represents diversions occurring between October 1 – March 31. The CDV would not exceed the capacity of the storage ponds, 61.4 acre-feet.

**Pine Gulch Creek Diversion and Minimum Bypass Flow Objectives**
The pumping plan ensures that, at all times, maximum pumping rates do not exceed more than 10% of the **average daily flow** in Pine Gulch Creek. Additionally, the project has identified minimum bypass flow requirements for the winter and spring diversion seasons that protect fish habitat and movement requirements, and are feasible for the project applicants. In most cases, the minimum bypass has been established to insure that instantaneous withdrawal rates will not exceed 15% of the instantaneous flow, with the exception of the June minimum bypass flow. Pumping rates and minimum bypass are presented by season, below.

**Compliance Monitoring**
The document includes a series of monitoring measures that will be implemented within the watershed and by the farmers to insure compliance as part of this project. In addition to monitoring activities, the program would include a regular meeting schedule that would allow for responsive management of the project with accumulated information. The monitoring measures include:

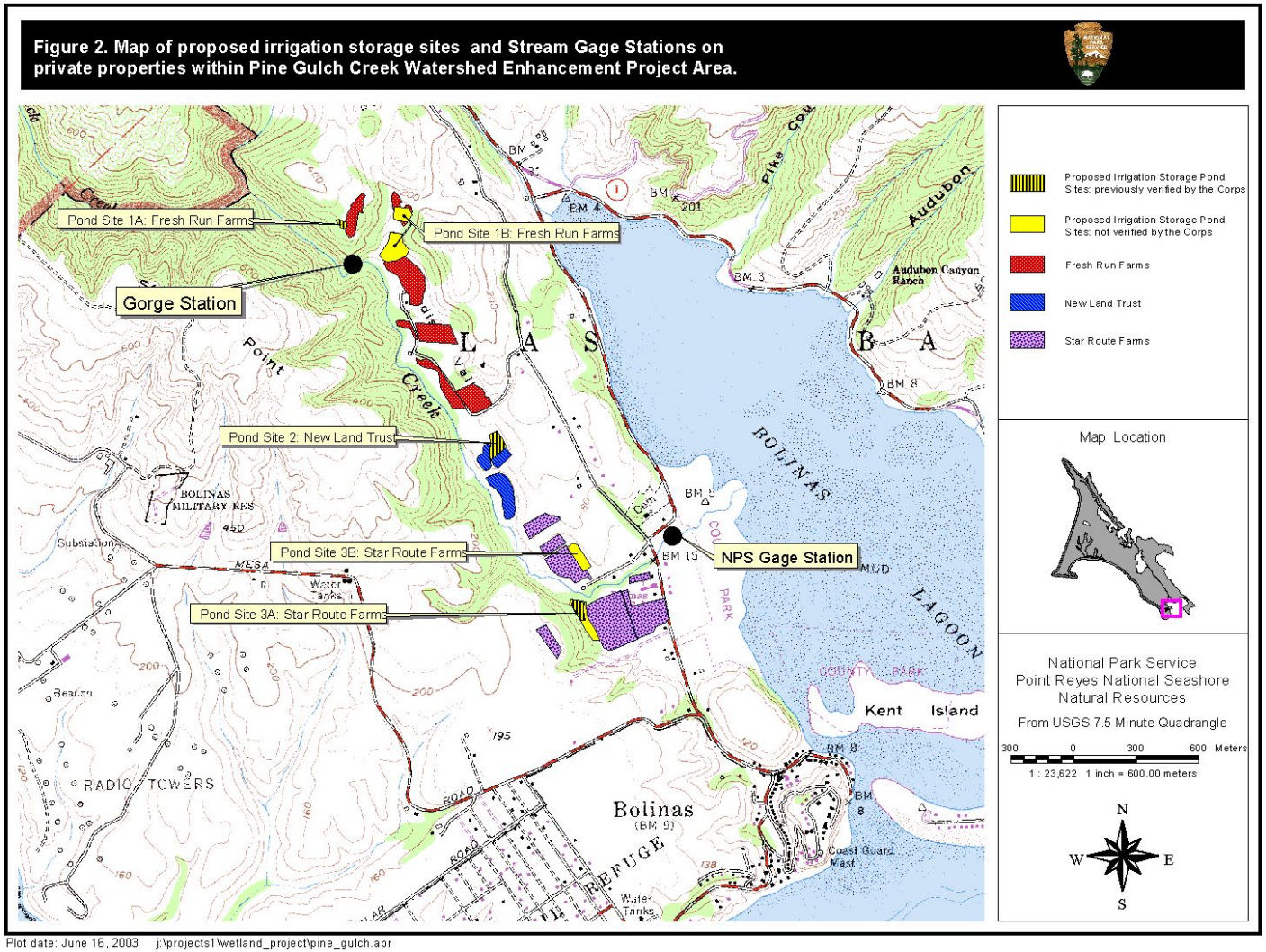
- Summer streamflow monitoring upstream of the Martinelli diversion
- Pump log and monthly operation summaries
- Ongoing streamflow monitoring below Olema-Bolinas Road Bridge
- Annual salmonid surveys conducted and reported through the NPS
- Annual Meeting schedule

**Conclusion**

The proposed actions by the participating farmers in Pine Gulch Creek will result in significant, long-term protection and management of aquatic habitat on private lands within the watershed. While the National Park Service manages 85% of the watershed area (primarily upstream), the remaining 15% of private lands include nearly 30% of the mainstem aquatic habitat known to support coho salmon and steelhead trout. This cooperative arrangement by the farmers to improve their environmental and agricultural sustainability within this rich and unique watershed and ecosystem is precedent setting. The participants in this project are dedicated organic farmers who see this as a unique sustainable model of cooperation and successful resource management. This project represents significant adjustment and alteration of their current operations but is understood as a valuable and necessary step for the long-term sustainability of agriculture and salmonids in the watershed.

**Disclaimer**

This project applies solely to the cooperating farms, and does not preclude other landowners from drawing riparian water in the summer season. This document, however, describes total watershed production, and should be used to weigh the impacts of future diversion to both the project, and the habitat supporting coho salmon and steelhead. Other landowners requesting diversions would be required to obtain a 1600 permit through the California Department of Fish and Game for habitat protection. Future water rights determinations within the watershed should recognize the commitments by these farmers and protect the water rights established through this process. The level of work involved in this project has established a significant precedent to which future diversion permit applications should be held.




**Map of proposed irrigation storage sites and stream monitoring location**